Austin/Travis County Health and Human Services Department

The role of public health is to:

PROMOTE community-wide wellness,

PREVENT disease, and

PROTECT the community from infectious diseases, environmental hazards, and epidemics

FLUORIDATION BRIEFING

PUBLIC HEALTH AND HUMAN SERVICES COMMITTEE

March 22, 2011

Presenters

Dr. Philip Huang, Medical Director, HHSD

Jane Burazer, Assistant Director, Austin Water Utility

Fluoride is Naturally Occurring

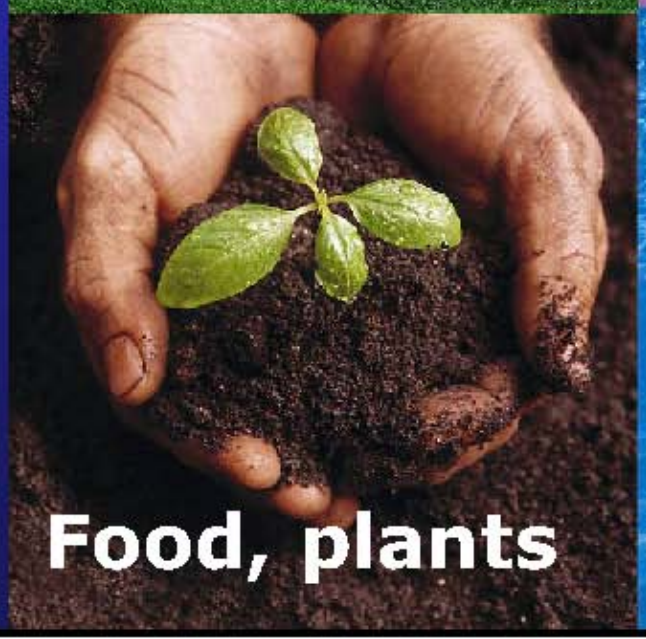
Fluoridation Basics

Soil:

13th most abundant element in earth's crust

Air:

50% Volcanic
25% wind erosion
25% anthropologic



Food, plants

Water:

Surface water
0.1 mg/L
Groundwater zero to 5 mg/L
Ocean water
0.8 to 1.4 mg/L

Fluoridation Definition

- **Fluoridation: *adjustment* of fluoride to a level beneficial for reduction of tooth decay**

Natural F in water + Added F = 0.7 mg/L

Optimal Range

- 0.7 part per million (ppm) is the same as 0.7 milligram per liter (mg/L)

Benefits

Fluoridation in Context

- At the time when CWF was initiated:
  - Extractions of first permanent molars in children were common
  - The typical school child developed new cavities each year
  - Full extractions and complete dentures were the norm for most older adults
  - Recruits into WWII rejected because of poor oral health – 6 opposing teeth -10% rejection rate – 40% needed immediate treatment for relief of pain
  - Dowries of new brides could include dentures
  - HS graduates sometimes received gift of complete dentures

Is Fluoridation Still Important?

- For the past 65 years, fluoride has been a principal contributor to reduction in tooth decay and loss. Community water fluoridation has played a major role in this dramatic decline in tooth decay across all age groups
- Despite dramatic declines, tooth decay is still the most common childhood chronic disease afflicting two-thirds of children
- Inexpensive, and does not depend on access to professional care

Fluoridation Basics

Systemic vs Topical Benefits

Systemic

- Earliest researchers - hypothesized fluoride incorporated into developing enamel
- Continued evidence supports of systemic benefit

Topical

- Predominant effect is topical posteruptive
- Right amount, right place, right time
- Small amounts consistently in the mouth
- All people, all ages benefit with topical fluoride

Benefits

Scientific Reviews

- Fluoride in Drinking Water - Guidelines for Canadian Drinking Water Quality for Public Consultation, Canada (2009)
- National Health & Med Research Council, Australia (2007)
- Findings and Recommendations of the Fluoride Expert Panel (January 2007)
- National Research Council, U.S.A. (2006)
- ATSDR Toxicological Profile for Fluorides, Hydrogen Fluoride, and Fluorine (2003)
- U. S. Guide to Community Preventive Services (2002)
- Forum on Fluoridation, Ireland (2002)
- Medical Research Council, U.K. (2002)
- CDC Fluoride Recommendations (2001)
- University of York, UK (2000)
- U.S. Surgeon General's Report (2000)
- Institute of Medicine, U.S.A. (1999)
- World Health Organization (1994)
- National Research Council U.S.A. (1993)
- PHS Report, U.S.A. (1991)

US Task Force on Community Preventive Services

- The Task Force is an independent, nonfederal, volunteer body of experts in public health and prevention research, practice and policy, appointed by the CDC Director to:
  - Oversee systematic reviews done for the Community Guide .
  - Develop evidence-based recommendations on the basis of the systematic review results .
  - Identify areas in need of further research

US Task Force on Community Preventive Services: Community Water Fluoridation

Summary of Task Force Recommendations & Findings

The Task Force on Community Preventive Services recommends community water fluoridation based on strong evidence of effectiveness in reducing tooth decay.

Results from the Systematic Reviews

- Twenty-one studies qualified for review.
- Decay rates measured before and after water fluoridation: median decrease of 29.1% among children ages 4 to 17 years when compared with control groups (21 study arms).
- Decay rates measured after water fluoridation only: median decrease of 50.7% among children ages 4 to 17 years when compared with control groups (20 study arms).
- Fluoridation was found to help decrease tooth decay both in communities with varying decay rates and among children of varying socioeconomic status.

US Task Force on Community Preventive Services: Community Water Fluoridation

Results from the Systematic Reviews (Cont.)

- Nine studies qualified for review of the economic efficiency of community water fluoridation programs.
- Median cost per person per year for 75 water systems receiving fluoridated water: $2.70 among 19 systems serving < =5000 people to $0.40 among 35 systems serving >=20,000 people (7 studies).
- Community water fluoridation was cost saving (5 studies).
- In smaller communities (5000 to 20,000 residents), fluoridation was estimated to be cost-saving where decay incidence in the community exceeds 0.06 tooth surfaces per person annually.

Organizations That Support Fluoridation

- Academy of Dentistry International
  Academy of general Dentistry
  Academy of Sports Dentistry
  Alzheimer's Association
  American Academy of Allergy, Asthma and Immunology
  American Academy of Family Physicians
  American Academy of Oral and Maxillofacial Pathology
  American Academy of Pediatrics
  American Academy of Pediatric Dentistry
  American Academy of Periodontology
  American Association for the Advancement of Science
  American Association for Dental Research
  American Association of Community Dental Programs
  American Association of Dental Schools
  American Association of Endodontists
  American Association of Oral and Maxillofacial Surgeons
  American Association of Orthodontists
  American Association of Public Health Dentistry
  American Cancer Society
  American College of Dentists
- American College of Physicians - American Society of Internal Medicine
  American College of Prosthodontists
  American Council on Science and Health
  American Dental Assistants Association
  American dental Association
  American Dental Hygienists' Association
  American Dietetic Association
  American Federation of Labor and Congress of Industrial Organizations
  American Hospital Association
  American Medical Association
  American Nurses Association
  American Osteopathic Association
  American Pharmaceutical Association
  American Public Health Association
  American School Health Association
  American Society of Clinical Nutrition
  American Society of Dentistry for Children
  American Society for Nutritional Sciences
  American Student Dental Association
  American Veterinary Medical Association
  American Water Works Association
  Association for Academic Health Centers

Organizations That Support Fluoridation (Cont.)

- Association of Maternal and Child Health Programs
  Association of State and Territorial Dental Directors
  Association of State and Territorial Health Officials
  British Dental Association
  British Fluoridation Society
  British Medical Association
  Canadian Dental Association
  Canadian Dental Hygienists Association
  Canadian Medical Association
  Canadian Nurses Association
  Canadian Paediatric Society
  Canadian Public Health Association
  Chocolate Manufacturers Association
  Consumer Federation of America
  Delta Dental Plans Association
  The Dental Health Foundation (of California)
  European Organization for Caries Research
  FDI World Dental Federation
  Federation of Special Care Organizations in Dentistry
  Academy of Dentistry for Persons with Disabilities
  American Association of Hospital Dentists
  American Society for Geriatric Dentistry
  Health Insurance Association of America Health Resources and Services Administration (HRSA)
  Hispanic Dental Association Indian Health Service (IHS)
  International Association for Dental Research
  International Association for Orthodontics
- InstInternational College of Dentists
  itute of Medicine/National Academy of Sciences
  National Alliance for Oral Health
- National Alliance for Oral Health
  National Association of County and City Health Officials
  National Association of Dental Assistants
- National Cancer Institute
- National Center for Fluoridation Policy and Research
- National Confectioners Association
  National Council Against Health Fraud
  National Dental Assistants Association
  National Dental Association
  National Dental Hygienists' Association
  National Down Syndrome Congress
  National Down Syndrome Society
  National Foundation of Dentistry for the Handicapped
  National Institute of Dental and Craniofacial Research
- National Kidney Foundation
  National PTA
  National Research Council
  Society of American Indian Dentists
- US Centers for Disease Control and PreventionS
  Department of Defense
  US Department of Veterans Affairs
  US Public Health Service
  World Federation of Orthodontists
  World Health Organization

Public Health Measure

Community Water Fluoridation

CDC named water fluoridation as one of 10 great public health achievements of the 20th Century

Fluoride Issues

- **Interpretation of research findings**
- **2006 National Research Council Report**

  "The Committee did not evaluate the risks or benefits of the lower fluoride concentrations (0.7 to 1.2 mg/L) used in water fluoridation. Therefore, the committee's conclusions regarding the potential for adverse effects from fluoride at 2 to 4 mg/L in drinking water do not apply at the lower water fluoride levels commonly experienced by most U.S. citizens."
- **CDC Recommendations on Infant Formula and Enamel Fluorosis**

  "Water fluoridation is safe, effective and healthy. Water fluoridated at a level optimal for oral health poses no known health risks for infants. However, some children may develop enamel fluorosis, a cosmetic condition."
- **"Fertilizer Byproduct"**

AUSTIN WATER UTILITY
Fluoridation Practices

FLUORIDATION BACKGROUND

- Austin Water began fluoridating the drinking water supply in February 1973 as required by Resolution #720911-1
  - More than 170 cities in Texas Fluoridate
  - Most major US Cities fluoridate
- Dosage levels for fluoridation were set based on the Center for Disease Control recommendations for optimal fluoride levels
- Product used must meet all NSF/ANSI Standard 60 Certification

Fluoride Dosages

- CDC Recommendations for Optimal Fluoridation recently changed
  - Prior to January 7, 2011 the optimal range was 0.7 – 1.2 mg/l based on annual average of maximum daily temperatures
  - Current recommendation is 0.7 mg/l
  - Austin Water was already at 0.7 mg/l when recommendation changed
  - CDC does not have regulatory authority over the water industry, EPA does

Regulatory Requirement

- The EPA establishes maximum contaminant levels for compounds in water at levels to ensure no adverse health effects
  - Current regulation: MCL for fluoride is 4.0 mg/l to prevent stage 3 skeletal fluorosis and a secondary goal of 2.0 mg/l to prevent dental fluorosis
  - Austin Water is at 0.7 mg/l

EPA Reviewing the Fluoride MCL

- EPA, based on recommendations from the NRC Report in 2006, initiated a review to determine whether appropriate to take next steps to revise the standards.
  - The NRC Report in 2006 reviewed the MCL for fluoride, it did not evaluate fluoridation.
- Review process will consider health, treatment technology, analytical methods occurrence, etc.
- A timeframe for finalizing the review has not been established.

Product Quality

- EPA and TCEQ require any product used in the production of drinking water must be certified to NSF/ANSI Standard 60: Drinking Water Chemicals – Health Effects
  - NSF certifies three products for fluoridation: Fluorosilicic Acid, Sodium Fluorosilicate, and Sodium Fluoride
  - Third party review to ensure purity of product

Cost of Water Fluoridation

- Costs for fluoridating the water in FY 2010:
  - Fluorosilicic Acid-- $463,491
  - Labor costs for off-loading chemical--$2,223
  - Maintenance Costs for fluoride system
    - Labor--$12,327
    - Materials--$8,132
  - Total Cost of $489,717
    - Equates to 55¢ per capita per year